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10/612,096

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Joo-Won Lee

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7590

12/07/2005

Anthony P. Onello, Jr.
MILLS & ONELLO LLP
Suite 605
Eleven Beacon Street
Boston, MA 02108

EXAMINER

NADAV, ORI

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. **10/612,096**Applicant(s) **LEE ET AL.**Examiner **Ori Nadav**Art Unit **2811**

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ejiri (6,770,974) in view of Applicant Admitted Prior Art (AAPA).

Ejiri teaches in figure 13 and related text an electrode line structure of a semiconductor device comprising:

a semiconductor substrate 10, and

an electrode line 18 formed on the semiconductor substrate, the electrode line having an inclined outer end in the long axis direction;

wherein the electrode line comprise one of word line and bit line of the semiconductor device, and wherein the electrode line includes a first line unit 18b, which substantially functions as an electrode line, a second line unit 18c, which includes the inclined outer end in the long axis direction and which is separated from the first line unit by a predetermined distance, and an insulating plug 24, which is interposed between the first line unit and the second line unit and electrically insulates the first line unit from the second line unit, an upper surface of the second line unit being of uniform

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height above the substrate over the entire length of the second line unit between the insulating plug and the inclined outer end.

Ejiri does not disclose that the device comprises plurality of electrode lines being one of word lines and bit lines.

AAPA teaches in figure 1B plurality of electrode lines 20 having inclined ends and being one of word lines and bit lines.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use plurality of electrode lines in Ejiri's device in order to use the device in a practical application which includes plurality of electrode lines, and in order to improve the characteristics of a device in an application which requires one of word lines and bit lines.

The combination is motivated by the teachings of AAPA, which point out the need to prevent the electrode of the device from being partially removed during the etching process (pages 1-3), and by the teachings of Ejiri who points out the advantages of preventing the electrode of the device from being damaged during the etching process (e.g. column 6, lines 1-6).

Regarding claims 2 and 3, Ejiri does not state that the length of the electrode lines greater than a length of conventional electrode lines by a predetermined length and the insulating plug is formed at a predetermined position of each of the electrode lines such that the first line unit has the ordinary length. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the length of the

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electrode lines greater than a length of conventional electrode lines by a predetermined length and the insulating plug is formed at a predetermined position of each of the electrode lines such that the first line unit has the ordinary length in Ejiri's device in order to use the device in an application which requires specific electrode length.

Regarding claim 4, Ejiri teaches in figure 13 and related text the length of the second line unit is greater than a width of the electrode lines and less than the ordinary length.

Regarding claims 5 and 8, AAPA teaches the first line unit and the second line unit each comprise a conductive layer and a hard mask layer, respectively, a spacer is formed on the inclined end in the long axis direction of the second line unit. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the first line unit and the second line unit each with a conductive layer and a hard mask layer, respectively, and to use a spacer on the inclined end in the long axis direction of the second line unit, in Ejiri's device in order to form the electrode lines in a conventional method using hard mask, in order to provide better protection to the electrode lines, respectively.

Regarding claims 6 and 7, Ejiri teaches a conductive layer comprises a material containing tungsten. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use electrode lines comprising a material containing tungsten and a hard mask layer comprises a silicon nitride layer or a silicon

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oxynitride layer in Ejiri's device in order to provide better conductivity and insulation to the electrode lines.

Regarding claim 9, Ejiri does not teach forming the insulating plug of a material of which the spacer is formed. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the insulating plug of a material of which the spacer is formed in Ejiri's device in order to simplify the processing steps of making the device.

Response to Arguments

Applicant argues that it is not obvious and there is no motivation to combine Ejiri with AAPA, because Ejiri and AAPA are concerned with different technologies.

It would have been obvious to an artisan to combine Ejiri with AAPA, because Ejiri solves the problems discussed in AAPA. AAPA point out the need to prevent the electrode of the device from being partially removed during the etching process (pages 1-3), wherein Ejiri points out the advantages of preventing the electrode of the device from being damaged during the etching process (e.g. column 6, lines 1-6).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Loke can be reached on 571-272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Ori Nadav', is positioned above the printed name.

O.N.
12/5/05

ORI NADAV
PRIMARY EXAMINER
TECHNOLOGY CENTER 2800